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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,976	01/29/2004	Peng Chang	SAR-14948	4351

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PATENT DOCKET ADMINISTRATOR
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EXAMINER	
LE, BRIAN Q	

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 11/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/766,976	CHANG ET AL.	
	Examiner	Art Unit	
	Brian Q. Le	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *9/11/2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment and Arguments

1. Applicant's amendment filed September 11, 2006, has been entered and made of record.

2. Applicant's arguments with regard to claims 1-28 have been fully considered, but are not considered persuasive because of the following reasons:

Regarding claims 1-5, 7, 13-14, 16, 20-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Franke et al., the Applicant argues (page 8) that Franke fails to teach the producing, tessellating and detecting occur in a chronological order. The Examiner respectfully disagrees, Franke teaches the processing of steps subsequently and therefore in a chronological order (page 41, column 2, "Obviously, this classification scheme cannot guarantee uniqueness of the ... which is the basis for all subsequent steps."; page 42, column 1 and column 2; and page 44, column 2, "Overall, it follows the same steps as arrow detection-that is, color segmentation, filtering, and classification ...using a polynomial classifier.").

Thus, the rejections of all of the claims are maintained.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Regarding claims 1, 13, and 20, the amended limitation "wherein said producing,

tessellating and detecting occur in a chronological order" is not supported in the original disclosure. The Applicant must clearly show page number and line number that show the support for this limitation.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4, and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Awe Franke et al. Autonomous Driving Goes Downtown. I.E.E.E. Intelligent Systems, 1998, pages: 40-48.

Regarding claim 1, Franke teaches a method of detecting an imminent collision (page 40, column 1) comprising the steps of:

Producing from imagery a depth math of a scene proximate a platform (2D depth map) (page 41, column 3, last 3 lines);

Tessellating the depth map into a number of patches and selecting a plurality of the patches for processing (the selection of rectangular boxes of point features/patches to generate depth map) (FIG. 4 and page 42, column 1).

Detecting a potential threat in the tessellated depth map during the processing of the selected plurality of the patches (page 42, column 1, and FIG. 4) (page 41, first column, "stereo-based obstacle detection and tracking", first paragraph; page 41, third column, last paragraph), wherein said producing, tessellating and detecting occur in a chronological order

(page 41, column 2, "Obviously, this classification scheme cannot guarantee uniqueness of the ... which is the basis for **all subsequent steps**."; page 42, column 1 and column 2; and page 44, column 2, "Overall, it follows the same steps as arrow detection-that is, color segmentation, filtering, and classification ...using a polynomial classifier.");

Estimating the size of the detected potential threat (object's width) (page 42, column 1, second paragraph);

Estimating the position of the detected potential threat (page 42, column 2, first 5 lines);

Estimating the velocity of the detected potential threat (motion/speed/acceleration estimation) (page 42, column 1 and column 2);

Performing a trajectory analysis of the detected potential threat using the estimated position and the estimated velocity (road recognition) (page 42, column 3, Road Recognition to page 43, column 1); and

Performing a collision prediction based on the trajectory analysis (estimation of relevant traffic and potential obstacles) (page 41, column 1).

For claim 2, Franke discloses the method further including determining if a collision is imminent based on the collision prediction (obstacle detection) (page 41, column 3, last 3 lines and page 47) and on the estimated size (object's width) (page 42, column 1, second paragraph) of the potential threat.

Referring to claim 3, Franke also teaches a method further including filtering the estimated position and filtering the estimated velocity before performing trajectory analysis (Kalman Filter to estimate motion/speed/acceleration (page 42, column 1 and column 2);

For claim 4, Franke teaches the method wherein the filtering includes Kalman Filtering

(page 41, column 3).

Regarding claim 5, Franke further discloses the method wherein estimating the velocity of the detected potential threat includes the step of identifying 2-dimensional feature correspondences from imagery produced in different frames (2D depth map to track cluster of image frame to frame) (page 41, column 3, last 3 lines to page 42, column 1).

For claim 7, Franke teaches the method wherein estimating the velocity of the detected potential threat further includes the step of estimating velocity using Random Sample Consensus (arbitrary data) (page 43, column 1).

Regarding claim 13, please refer back to claims 1 and 2 for the teachings and explanations.

For claim 14, Franke teaches the system wherein said collision detector includes a filter for filtering image noise and outliers from said estimated position and from said estimated velocity before performing trajectory analysis (Kalman Filter) (page 41, column 3).

Referring to claim 16, Franke teaches the system further including a host vehicle, wherein said stereo camera pair is mounted in fixed locations relative to said host vehicle (page 41, column 2, second paragraph and FIG. 1).

Regarding claim 20, please refer back to claim 1 for the teachings and explanations. In addition, Franke teaches a computer readable medium having stored thereon a plurality of instructions, the plurality of instruction including instructions which, when executed by a processor causes the processor to perform the claimed limitations (computers to run program including instructions) (page 47, column 3).

For claims 21-22, please refer back to claims 3 and 5 for the teachings and explanations.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awe Franke et al. Autonomous Driving Goes Downtown. I.E.E.E. Intelligent Systems, 1998, pages: 40-48 as applied to claim 1 above, and further in view of Ming Yang et al. Vision-based Real-time Obstacles Detection and Tracking for Autonomous Vehicle Guidance. Real-time Imaging VI, Proceedings of SPIE Vol. 4666, pages 65-74, 2002.

Regarding claim 6, Franke teaches the 3D map of the environment and 2D depth map (page 41, "Stereo-based obstacle detection and tracking", first paragraph) in estimating the velocity of detected of potential threat. However, Franke does not explicitly teach the obtaining 3D correspondences from the 2-dimensional feature. Ming teaches a system for obstacles detection and tracking for autonomous vehicle guidance which shows that it is well known to extract 3D information from 2D images for visual guidance (page 65, Introduction, second paragraph). Modifying Franke's method of detecting collision would able to further provide the flexibility for visual guidance in detecting obstacles. This would improve processing and therefore, it would have been obvious to one of the ordinary skills in the art to modify Franke according to Ming.

Regarding claim 15, please refer back to claims 5 and 6 for the teachings and explanations.

Allowable Subject Matter

9. Claims 8-12, 17-19, 24-26, and 27-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Q. Le whose telephone number is 571-272-7424. The examiner can normally be reached on 8:30 A.M - 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BL
November 13, 2006

JINGGE WU
PRIMARY EXAMINER